SSAR

Society for the Study of Amphibians and Reptiles

CONSERVING AMPHIBIANS AND REPTILES

The science of *conservation biology* seeks to provide the scientific basis for management and conservation programs. To conserve amphibians and reptiles, we must understand life histories; to plan for species and ecosystem recovery, we must know the reasons for decline and take a long term approach. SSAR strongly supports the conservation of amphibians and reptiles and their habitats. We also recognize that research is essential to this goal, and that research must be encouraged with as little hindrance as possible. Research must focus on causes and solutions, and conservation programs need to be on guard against 'half-way' technologies that provide a false sense of accomplishment. Below, we briefly note some problems and solutions to conserving our Herpetological natural heritage.

Amphibian Declines

Serious declines in amphibian populations have been documented in many areas around the world in the last 20 years, including North America, Central America, Europe, and Australia. The declines are significant because they are occurring in some of the largest parks and wilderness areas and because the cause(s) of the declines remain largely unknown. In North America, there have been significant declines in the Sierra Nevada mountains involving at least six native frog species. Many isolated frog populations in the desert Southwest have disappeared. Throughout the Great Lakes area, significant declines have occurred in addition to the appearance of severe deformities (e.g. extra or missing legs, missing or displaced eyes). In the southern US, many Coastal Plain species are suspected to be in decline. It is unlikely that a single, global factor is affecting amphibians. Among the most likely causes are habitat destruction/alteration, pesticides/herbicides, introduction of non-native species (especially fish), disease, and an increase in ultraviolet radiation due to atmospheric ozone depletion. Amphibian deformities have become a high-profile topic and cause for concern, but in most areas, declines are occurring in the absence of deformities.

Conserving Freshwater Turtles

Many freshwater turtles face serious threats to their survival. The large river-dwelling species, especially, have been heavily impacted. Freshwater turtles are relished as food, and a huge national and international commercial trade occurs in many parts of the world, including North America. Many species are sold for their organs and shell to be used in various cultural medicines, tonics, and elixirs, especially in Asia. A number of countries have lost a significant proportion of their freshwater turtle fauna to supply the medicinal export trade to China and elsewhere. A multi-million dollar pet trade drains wild populations of freshwater turtles and terrestrial box turtles. Turtle ranchers in the United States are one of the world's main suppliers, replenishing their breeding stock from wild populations. Freshwater turtles are threatened by habitat alteration, elimination, and degradation, as well as through the unnatural overabundance of efficient nest predators, such as raccoons. Research suggests that the consequences of a reduction in population size are extremely serious for turtles. Their life history characteristics (e.g., long life, high adult survivorship, low recruitment) make it very difficult for them to recover from chronic stress.

Sea Turtle Conservation

All sea turtle species are threatened or endangered with extinction and protected both by the U.S. Endangered Species Act and a number of important international conservation treaties. Sea turtle populations have been reduced in size worldwide due to human interference at nesting beaches and in marine habitats. Specific threats to sea turtles include habitat alteration and destruction, marine pollution (especially by plastic debris), incidental capture in recreational and commercial fisheries, and direct take of turtles and their eggs for commercial and local use. Recovery efforts for sea turtle populations are focused primarily on determining the locations of critical habitats and reducing threats to adults and juveniles in these areas. Because sea turtles are highly migratory and travel through the national and international waters of many nations, conservation efforts must include the development of multilateral agreements to manage and protect them on a regional level.

Species At Risk in Deserts

The conservation of desert herpetofauna is largely a matter of adequately controlling the multiple and often overlapping human activites that impact fragile desert habitats. These include urbanization, agriculture, livestock ranching, off-road vehicles, mining, oil and gas exploration, construction of solar and wind-driven power plants, energy transmission corridors, military training sites, and a complex array of highways. The net impact of these activities is difficult to measure, but the resulting fragmentation, degradation, and destruction of desert habitats decreases the abundance and diversity of the herpetofauna through time. A clear warning sign of our lack of stewardship is the current listing of several key desert herps as threatened or endangered (e.g., desert tortoise). Only through co-ordinated planning by federal, state, and local governments, environmental organizations, scientists, and a concerned public can we hope to succeed in conserving the remarkably diverse herpetofauna of our North American deserts.

Conservation Priority: Protect the Habitat!

Ultimately, the key to protecting amphibians and

reptiles is to conserve natural habitat. Whereas some small species might be able to persist for decades on a few acres of disturbed woodland, larger species occupying the top levels of the food chain require the protection of thousands of acres to maintain viable populations. Habitat can be protected in many ways: a landowner's personal stewardship of his property, government incentives or regulation, or acquisition and dedication as conservation lands. International organizations, federal, state, and local governments, and private organizations such as The Nature Conservancy, have protected millions of acres of habitat that sustain populations of many amphibians and reptiles. Although the presence of reptiles and amphibians often is not the primary reason for protecting lands, a few "high profile" species such as marine turtles, tortoises, large lizards, and even amphibians have provided the impetus for important preservation efforts. Conservation efforts for species with complex life cycles must protect the full range of habitats required by all life stages. For example, many freshwater turtles need cover, basking sites, and feeding and nesting areas; many pond breeding amphibians require undisturbed spawning sites, safe migratory routes, and upland habitats, often at considerable distances from ponds, for feeding and overwintering. Conservation efforts need to ensure that habitats are connected to avoid the consequences of isolation and habitat fragmentation and shredding. Finally, recent research has shown that habitat protection must include the regional landscape as well as the local population. Many species form dynamic metapopulations whose function and continued existence are as vital to a species's existence as are local populations. Habitats need to be protected in such a manner as to recognize the dynamic nature of reptile and amphibian populations both in space and time.

Conservation Genetics

Genetic diversity is the ultimate foundation of biodiversity, and genetic technology has many applications in the conservation of amphibians and reptiles. Thanks to recent technical advances, molecular genetic studies using mitochondrial DNA and microsatellite (nuclear) DNA can be undertaken nondestructively using a single drop of blood, a fragment of shed skin, a fecal sample, or even a toe clip. Molecular genetic assays help identify populations, the fundamental units of wildlife management. Phylogenetic studies based on DNA sequences have proven valuable for uncovering cryptic species which are not apparent through morphology alone. These findings can be used to set conservation priorities on the basis of evolutionary distinctiveness. Molecular genetic markers can also be used to identify species found in commercial trade and, in some cases, can even trace the location from which a specimen or product originated.

Ecotourism

Ecotourism is tourism which is planned and carried out in a manner which protects natural and human resources, promotes conservation by producing economic benefits, protects habitat, and generally provides a basis for the protection of biodiversity. Ecotourism, particularly nature-based tourism, is one of the fastest growing segments of tourism; visitors marvel at some of the most sensitive and protected areas in the world. And it can have both positive and negative impacts on remaining natural areas. As part of this market, herpetological tourism has grown more than 400% over the past 5 years alone. The SSAR is concerned that ecotourism be planned and carried out in a sustainable and responsible fashion. Herpetological tours, whether for scientific research or simply photography and observation, should follow sound conservation practices under the auspices of the regulations of the host governments.

Education and Conservation

All successful conservation programs include a strong educational component. The focus of education may be directed at certain groups (landowners, legislators, recreationists) but the most significant are aimed at a broad segment of society. Nowhere is this more true than in the conservation of amphibians and reptiles, where generations of prejudice, unwarranted fears, and confusing information all become major barriers that must be overcome. Despite impediments, amphibian and reptile conservation is proceeding well in some areas thanks, in part, to successful education. For example, understanding the importance of American alligators to the entire ecosystem has effectively conserved that species. Such recognition occurs only with a broad based and accurate flow of information. Educational programs about herps and the ecosystems they depend upon must continue if we are to maintain the diversity of amphibians and reptiles throughout the world.

Conservation on the Internet

There are many World Wide Web sites for wildlife conservation. Most major conservation organizations have their own web site as do many conservation groups, national parks, zoos, and natural history museums. The four sites listed below contain links to several conservation oriented web pages and should offer a good starting point for persons wanting more information on conserving herps.

The SSAR Conservation Page:
http://falcon.cc.ukans.edu/~gpisani/conservation.html
Herpetological directory:
http://cmgm.stanford.edu/~meisen/herp/
U.S. Fish & Wildlife Service: http://www.fws.gov/
University of Florida Museum of Natural History:
http://www.flmnh.ufl.edu/natsci/herpetology/herpetology .htm

Where Can I Find More Information?

- For information on the **Federal** endangered and threatened species program, contact the Division of Endangered Species, U.S. Fish and Wildlife Service, 1849 C Street NW, Washington, DC 20240.

- For information within your **State** or **Province**, contact your natural resource or wildlife management agency. Addresses can be found in Levell (1996), and most agencies now maintain Internet sites.

Levell, J. 1996. A Field Guide to Reptiles and the Law. Serpent's Tale Books, Excelsior, MN.